Canola Oil

1 Nonproprietary Names

BP: Refined Rapeseed Oil

PhEur: Rapeseed Oil, Refined

USP–NF: Canola Oil

2 Synonyms

Canbra oil; *Colzao CT*; huile de colza; *Lipex 108*; *Lipex 204*; *Lipovol CAN*; low erucic acid colza oil; low erucic acid rapeseed oil; rapae oleum raffinatum; tower rapeseed oil.

3 Chemical Name and CAS Registry Number

Canola oil [120962-03-0]

4 Empirical Formula and Molecular Weight

Canola oil contains approximately 6% saturated acids, 62% monounsaturated acids, and 32% polyunsaturated acids. Additionally, sulfur-containing fatty acids may also be present as minor constituents.

Unrefined canola oil is said to contain low levels of sulfur-containing fatty acids, resulting in the presence of sulfur in the oil in the stable form of triglycerides. These triglycerides resist refining procedures.[2] *See* Table I for the sulfur content of crude, refined, and deodorized canola oils.[3]

Table I: Total sulfur content in crude, refined, and bleached and deodorized canola oil.[a]

Oil sample	Range (mg/kg)	Mean	Standard deviation
Crude	23.6–24.1	23.8	1.0
Refined	19.1–20.2	19.7	2.85
Bleached and deodorized	15.6–16.5	16.2	2.7

(a) Determined using five replicates of each sample analyzed by ion chromatography.

5 Structural Formula

See Section 4.

6 Functional Category

Emollient; lubricant; oleaginous vehicle.

7 Applications in Pharmaceutical Formulation or Technology

Canola oil is a refined rapeseed oil obtained from particular species of rapeseed that have been genetically selected for their low erucic acid content.[4] In pharmaceutical formulations, canola oil is used mainly in topical preparations such as soft soaps and liniments. It is also used in cosmetics.

8 Description

A clear, light yellow-colored oily liquid with a bland taste.

9 Pharmacopeial Specifications

See Table II.

Table II: Pharmacopeial specifications for canola oil.

Test	PhEur 9.2	USP 40–NF 35 S1
Identification	+	+
Characters	+	—
Specific gravity	—	0.906–0.920
Acid value	≤0.5	≤6.0
Alkaline impurities	+	—
Iodine value	—	110–126
Peroxide value	≤10.0	≤10.0
Saponification value	—	178–193
Unsaponifiable matter	≤1.5%	≤1.5%
Refractive index	—	1.465–1.467
Heavy metals	—	≤10 ppm
Fatty acid composition	+	+
Carbon chain length <14	—	0.1%
Eicosenoic acid	≤5.0%	<2.0%
Erucic acid	≤2.0%	≤2.0%
Linoleic acid	16.0–30.0%	<40%
Linolenic acid	6.0–14.0%	<14%
Oleic acid	50.0–67.0%	>50%
Palmitic acid	2.5–6.0%	<6.0%
Stearic acid	≤3.0%	<2.5%

10 Typical Properties

Boiling point 313°C

Density 0.913–0.917 g/cm^3

Flash point 290–330°C

Free fatty acid ≤0.05% as oleic acid

Freezing point −10 to −2°C

Solubility Soluble in chloroform and ether; practically insoluble in ethanol (95%); miscible with fixed oils.

Viscosity (dynamic) 77.3–78.3 mPa s (77.3–78.3 cP) at 20°C

11 Stability and Storage Conditions

Canola oil is stable and should be stored in an airtight, light-resistant container in a cool, dry place. The USP 40–NF 35 S1 specifies that contact between canola oil and metals should be avoided. Containers should be filled to the top, while partially filled containers should be flushed with nitrogen. During storage, grassy, paintlike, or rancid off-flavors can develop.

Flavor deterioration has been attributed mainly to secondary oxidation products of linolenic acid, which normally makes up 6–14% of the fatty acids in canola oil. Storage tests of canola oil showed sensory changes after 2–4 days at 60–65°C in comparison to 16 weeks at room temperature. Canola oil seems to be more stable to storage in light than cottonseed oil and soybean oils, but is less stable than sunflower oil.[5] In addition, the effects of various factors on sediment formation in canola oil have been reported.[6]

It has been reported that oils stored at 2°C showed the highest rate of sediment formation, followed by those stored at 6°C.[5] All samples showed little sediment formation, as measured by turbidity, during storage at 12°C. Removal of sediment from canola oil prior to storage by cold precipitation and filtration did not eliminate this phenomenon, which still developed rapidly at 2°C.

A study on the effect of heating on the oxidation of low linolenic acid canola oil at frying temperatures under nitrogen and air clearly showed that a significantly lower development of oxidation was evident for the low linolenic acid canola oil. Reduction in the linolenic acid content of canola oil reduced the development of room odor at frying temperatures.

The thermal oxidation of canola oil studied during oven heating revealed an increase in peroxide values of pure and antioxidant-treated oils. Peroxide values were shown to differ between pure and antioxidant-treated canola oil during the initial stages of microwave